

WHAT IS CLAIMED IS:

1. A method for forming an oxide layer comprising:
5 (a) applying a coating material to a substrate;
(b) heating said first layer to a first process temperature for a first time duration to form a first processed layer; and
(c) heating said first processed layer to a second process temperature for a second time duration to form a second processed layer.

10 2. The method of Claim 1, further comprising:
applying a second layer of said coating material over said second processed layer;
heating said second layer of said coating material to said first process
15 temperature for said first time duration to form a third processed layer; and
heating said third processed layer to said second process temperature for said second time duration to form a fourth processed layer.

20 3. The method of Claim 1, wherein said thickness of said second processed layer is between about 1,000 Å and 1 µm.

25 4. The method of Claim 1, wherein said first time duration is between about five minutes to about ten minutes; and
wherein said second time duration is between about five minutes to about ten minutes.

5. The method of Claim 1, wherein said first process temperature is between about 200° C and about 400° C.

30 6. The method of Claim 1, wherein said second process temperature is up to about 1300° C.

7. The method of Claim 1, wherein said coating material comprises spin-on glass (SOG).

8. The method of Claim 7, wherein said heating to said first process temperature causes said SOG to outgas to form a layer of SiO₂; and wherein said second process temperature causes said layer of SiO₂ to cure.

9. The method of Claim 7, wherein said applying a coating material comprises applying a layer of spin-on glass to a substrate.

10. The method of Claim 1, wherein said substrate comprises a quartz substrate.

11. The method of Claim 1, further comprising repeating (a), (b), and (c) until an oxide layer of a pre-selected thickness is formed.

12. A method for forming an oxide layer on a substrate comprising:
(a) applying a first layer of a spin-on glass ("SOG") to a substrate;
(b) heating said first layer to a first process temperature for a first time duration to cause said first layer of SOG to outgas to form a layer of SiO₂; and
(c) heating said layer of SiO₂ to a second process temperature for a second time duration to cause said SiO₂ layer to harden.

13. The method of Claim 12, further comprising:
applying a second layer of SOG over said layer of SiO₂;
heating said second layer of SOG to said first process temperature for said first time duration; and
heating said second layer of SOG to said second process temperature for said second time duration.

14. The method of Claim 12, wherein said thickness of said SiO₂ layer is between about 1,000 Å and 1 μm.

15. The method of Claim 12, wherein said first time duration is between about five minutes to about ten minutes; and

wherein said second time duration is between about five minutes to about ten minutes.

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16. The method of Claim 12, wherein said first process temperature is between about 200° C and about 400° C.

10 17. The method of Claim 12, wherein said second process temperature is up to about 1300° C.

18. The method of Claim 12, wherein said substrate comprises a quartz substrate.

15 19. The method of Claim 12, wherein said applying a first layer of SOG to a substrate comprises dipping said substrate in a bath of said SOG.

20 20. The method of Claim 12, further comprising repeating (a), (b), and (c) until an SiO₂ layer of a pre-selected thickness is formed.

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21. An apparatus for forming an oxide film on a semi-conductor substrate comprising:

means for applying a first layer of a spin-on glass ("SOG") to a substrate;

25 means for heating said first layer to a first process temperature for a first time duration to cause said first layer of SOG to outgas to form a layer of SiO₂; and

means for heating said SiO₂ layer to a second process temperature for a second time duration to cause said SiO₂ layer to harden.

30 22. An apparatus for forming an oxide film on a substrate comprising:
a processing chamber defining a cavity configured to receive a substrate; and
a burner assembly disposed in said cavity configured to provide a plurality of flames fueled by process gases emanating from a first surface of said burner assembly, said flames directed perpendicular to said substrate.

23. The apparatus of Claim 22, wherein said substrate comprises a silicon wafer.

5 24. The apparatus of Claim 22, wherein said burner assembly comprises a plurality of nozzles configured in an array on said first surface of said burner assembly.

25. The apparatus of Claim 22 wherein said process gases comprise a mixture of H_2 and O_2 .

10 26. The apparatus of Claim 22, wherein said burner assembly comprises a first plurality of nozzles and a second plurality of nozzles, wherein a first process gas emanates from said first plurality of nozzles and a second process gas emanates from said second plurality of nozzles.

15 27. The apparatus of Claim 26, wherein said first process gas comprises H_2 and said second process gas comprises O_2 .

20 28. A method for forming an oxide film on a substrate comprising:
providing a substrate; and
heating said substrate using a plurality of process flames fueled with H_2 and O_2 and directed perpendicular to a first surface of said substrate, said plurality of process flames causing a formation of H_2O vapor and oxygen radicals, said H_2O vapor and said oxygen radicals used alone or in combination as reactant to form an oxidation layer on a
25 first surface of said substrate.

29. The method of Claim 28, wherein said heating is accomplished using a burner assembly, said plurality of process flames emanating from a first surface of said burner assembly.

30 30. The method of Claim 29, wherein said burner assembly comprises an array of nozzles, wherein said H_2 and O_2 emanate from each of said nozzles.

31. The method of Claim 29, wherein said burner assembly comprises a first plurality of nozzles from which said H_2 is provided and a second plurality of nozzles from which said O_2 is provided.

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